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COMPLETE SPECIFICATION

DRAWINGS ATTACHED

Improvements in or relating to Washing Machines

We, SIEMENS-ELECTROGERATE AKTIEN-GESELLSCHAFT, a German Company, of Berlin and Munich, Germany, do hereby declare the invention, for which we pray
5 that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to washing
10 machines, such as clothes washing machines, dish washing machines or other washing machines.

It is known to provide such washing
15 machines with a washing liquid container which has a loading opening connected to the associated outer casing by a flange like member. Such washing liquid con-
20 tainers and flanges are at present made separately in the case of washing machines having drums rotatable about horizontal
25 axes and which are loaded through openings in the cylindrical walls of the drums. These separate parts have to be connected
30 together in a water or vapour-tight manner by appropriate sealing elements in order
35 to prevent water or steam from getting into the adjoining motor compartment which is enclosed by the outer casing.

In accordance with the invention there
40 is provided a washing machine, such as a clothes washing machine or dish washing machine, the machine comprising an outer casing, and a washing liquid container arranged in said casing in such
45 a way that articles to be cleaned can be fed into the machine through a loading opening in the container, which opening is
50 located in a top of the container or in a side wall of the container, wherein the container is provided with an integral
55 flange like member disposed horizontally or vertically respectively according as to
60 whether the opening is formed in the top

or side of the container, and which mem-
65 ber defines said opening and is connected to the side walls or a side wall respectively of the outer casing, and wherein the container and flange like member are formed
70 integrally as a unit of a thermoplastic material, such as polypropylene or poly-
75 amide.

Owing to the integral nature of the
80 thermoplastic unit constituting both flange member and washing liquid container, there are no particular sealing difficulties
85 with this arrangement. In an embodiment of the invention, the thermoplastic unit can be formed by injection or blowing processes which make it possible to produce
90 the desired shape of washing liquid container with simple and inexpensive means.

An embodiment of the invention can
95 comprise a washing machine which has a washing liquid container built rigidly into the outer casing. However, a further
100 embodiment can comprise a washing machine which has a washing liquid container arranged resiliently in the outer casing by elastic means such as springs. It is
105 known to provide resilient arrangements of the container when it is desired to construct washing machines arranged for both
110 washing and spin-drying wherein owing to non-uniform distribution of the laundry, corresponding relative movements of the liquid
115 container with the laundry drum arranged in it must be dealt with. In this case, the washing liquid container will also be constructed as a single thermoplastic unit with
120 the flange like member, the region of the thermoplastic unit between the flange member and the washing liquid container being
125 made resilient. The resilient portion can be constructed e.g. in bellows form. Thus, by
130 interconnecting, for example, the upper portion of the washing liquid container and the

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flange member by a resiliently movable portion, vibratory movements can be absorbed with this construction of container. Moreover, a flap for the loading opening can be joined with its hinge directly to the washing liquid container made of thermoplastic material. Such a flap can be formed with an elastic connecting hinge, for example, on the flange like member surrounding the loading opening, integral with the thermoplastic unit. Furthermore, the space between the base of the plastics container and the drum can be more readily adapted to accommodate heating means than in the case of hitherto conventional sheet metal constructions which would involve much more complicated machining problems.

The thermoplastic material can be for example polypropylene, which is brought to the desired shape by an injection or blowing process. In order to obtain the desired mechanical strength for the container, it is possible to use as material a thermoplastic in which a reinforcement is arranged, in uniformly distributed manner. Reinforcing material which can be used includes, for example, glass fibres. It is also possible to insert particular reinforcements at places which are subjected to particularly heavy mechanical stresses. Places which are particularly stressed are regions used as bearing and fixing points. It is possible to use as reinforcements for the thermoplastic material at such points, metallic inserts or linings consisting of load bearing material. For the latter purpose, for example, layers of polyamide foil or a suitable metal can be used.

The invention can be used advantageously both in washing machines which have a drum rotatable about a horizontal axis, the drum being loaded through an opening in its cylindrical wall, and also in "porthole-type" machines. The invention can also be used in washing machines which have differently arranged drums, such as, for example vertical-axis drum machines.

For a better understanding of the invention and the method by which the same can be performed, reference will now be made, by way of example, to the accompanying drawings, in which:—

Figure 1 is a diagrammatic side elevation of a washing machine in accordance with the invention having a drum rotatable about a horizontal axis,

Figure 2 is a similar view of an alternative embodiment, and

Figure 3 is a view, similar to Figures 1 and 2, but of a further alternative embodiment.

Referring to Figure 1, the washing machine is a clothes washing machine and comprises an outer casing 1. By means

of tension springs 2, there is hung in said casing 1 a washing assembly which comprises a washing liquid container 3 and a drum 4 mounted within said container. 5 is an upper covering frame or flange like member of the container 3 which engages the side walls of and comprises the top or cover of the outer casing of the machine, and 6 designates resilient bellows which allow relative movement of the liquid container 3 relative to the flange 5. 7 designates a closure flap which has a handle 8. The liquid container 3, the bellows 6, the flange 5 and the flap 7 in this embodiment comprise an integral thermoplastic unit of, for example, polypropylene or polyamide which is produced by an injection or blowing process. The flap 7 is connected integrally to the rest of the thermoplastic unit by means of a resilient connecting strip 9 which acts as a hinge. A motor 10 is provided to drive the drum 4 through pulleys 11 and 13 and belt 12. 14 designates a flap or cover for the loading opening in the wall of the drum through which articles to be washed are introduced. 15 is a shock absorber connected to the resiliently suspended washing assembly comprising the container 3 and the drum 4. The relative movements of the washing assembly relative to the casing 1 are so compensated by an arrangement (not shown) which is associated with the belt drive to the drum so that the desired driving connection is obtained without interruption despite the oscillatory movements which occur during operation.

In Figure 2, 21 designates the outer casing, 22 the washing liquid container, and 23 the open ended drum of this washing machine. In this embodiment, clothes are fed to the drum from one side of the machine through bellows 24 having a flange 25 which engages one side wall of the casing 21. The washing liquid container 22, bellows 24 and flange 25 in this arrangement comprise a one-piece unit made of a thermoplastic material in similar manner to the preceding embodiment. The drum 23 is mounted on a shaft 26 which is driven from a motor 30 through pulleys 27 and 31 and belt 32. The washing assembly is suspended resiliently in the casing 21 by means of tension springs 28. A shock-absorber 29 is connected to the assembly.

The embodiment of Figure 3 is similar to that of Figure 1 in that clothes are fed through the top of the machine. 41 is the outer casing, 42 the washing liquid container and 43 the upper flange of the container 42 which is connected to the walls of the outer casing 41 of the machine. The container 42 and cover 43 are made in one piece from a thermoplastic material

in similar manner to the preceding embodiments. A flap 44 with a handle 45 is also integrally connected to the remainder of the thermoplastic unit by the use of a resilient connecting strip 46. The driving motor 47 with the pulleys 48, 50 and belt 49 is fixed on a rigid supporting frame 53 carrying two bearings 51, 52. The drum 54 is mounted in the bearings 51 and 52 by means of stub shafts which are arranged on either side of said drum.

WHAT WE CLAIM IS:—

1. A washing machine, such as a clothes washing machine or dish washing machine, the machine comprising an outer casing, and a washing liquid container arranged in said casing in such a way that articles to be cleaned can be fed into the machine through a loading opening in the container, which opening is located in a top of the container or in a side wall of the container, wherein the container is provided with an integral flange like member disposed horizontally or vertically respectively according as to whether the opening is formed in the top or side of the container, and which member defines said opening and is connected to the side walls or a side wall respectively of the outer casing, and wherein the container and flange like member are formed integrally as a unit of a thermoplastic material, such as polypropylene or polyamide.
2. A washing machine as claimed in claim 1, wherein the container and flange member unit are made of the thermoplastic material by an injection moulding or blowing process.
3. A washing machine as claimed in claim 1 or 2, wherein the container is resiliently mounted in the casing and wherein a resilient element in the form of bellows is provided between the container and the flange like member.
4. A washing machine as claimed in any preceding claim, wherein said member is provided with a flap or cover for

said loading opening when the opening is in the top of the container, and a resilient strip hingedly connects the flap or cover 50 integrally to said container unit.

5. A washing machine as claimed in any preceding claim, wherein reinforcement is introduced into said thermoplastic container in a uniformly distributed manner, the reinforcement comprising, for example, glass fibres.

6. A washing machine as claimed in claim 5, wherein reinforcement is arranged at regions which are subjected to relatively large stresses during operation.

7. A washing machine as claimed in any preceding claim, wherein the washing liquid container is provided with said loading opening in the top of said container and a drum rotatable about a substantially horizontal axis is mounted in said container and has an opening formed in the cylindrical wall of the drum which can be brought into register with said loading opening so that articles can be fed into said drum through said openings, and wherein said flange like member comprises the top of the washing machine.

8. A washing machine as claimed in any one of claims 1 to 6, wherein the washing liquid container is provided with said loading opening in a side wall of the container and a drum rotatable about a horizontal axis is mounted in said container and has an open end face so that articles can be fed into said drum through said opening.

9. A washing machine substantially as hereinbefore described with reference to any of the embodiments illustrated in the accompanying drawings.

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